

Amendments to the Specification

Please replace paragraph [0001] with the following amended paragraph:

[0001] The invention relates to a lightweight valve, in particular for internal combustion engines, ~~according to the preamble of claim 1~~ with a valve stem, with a hollow valve cone and with a valve disk closing the valve cone hollow space on one side, valve cone-supporting means being provided in the hollow space.

Please add the following new heading before paragraph [0002]:

BACKGROUND

Please replace paragraph [0002] with the following amended paragraph:

[0002] Lightweight valves of the kind referred to here are known (DE 198 04 053 A1). They are used inter alia as inlet and outlet valves for internal combustion engines and comprise a valve stem which is adjoined by a funnel/trumpet-shaped valve cone. For the purpose of weight reduction, the valve cone is hollow and has only a small wall thickness. The valve cone is closed at its end of greater diameter by means of a valve disk. According to one variant embodiment (figures 4 and 5 four and five of DE 198 04 053 A1), the valve cone is formed by a separate sheet-metal component which is welded together with the valve stem and the valve cone. For this, the end of greater diameter of the valve cone is positioned with its end face opposite an annular surface located on that flat side of the valve disk facing the valve cone. Accurate alignment of valve cone and valve disk in relation to one another is extremely difficult owing to the only small bearing contact surfaces of these parts. Moreover, the weld seam formation possibilities in the regions of connection of the valve cone to the valve disk and the valve stem are limited.

Please add the following new heading before paragraph [0005]:

SUMMARY OF THE INVENTION

Please amend paragraph [0006] as follows:

[0006] ~~To achieve the object,~~ The present invention provides a lightweight valve ~~with the~~

~~features of claim 1 is proposed with a valve stem, with a hollow valve cone and with a valve disk~~
closing the valve cone hollow space on one side, valve cone-supporting means being provided in the hollow space. This is characterized in that the valve cone-supporting means are provided at a distance from the valve disk. In addition to their actual function, namely supporting the hollow, thin-walled valve cone, the supporting means have a further function, namely accurate arrangement of the valve cone – seen in the direction of the longitudinal central axis of the lightweight valve – in the axial direction relative to the valve disk. The design and arrangement of the supporting means relative to the valve disk are preferably selected in such a way that, when the lightweight valve has been properly joined together, the valve cone is by way of the supporting means arranged at an axial distance measured in the direction of the longitudinal central axis of the valve stem, or of the lightweight valve, in relation to the valve disk in such a way that the joint surfaces of the valve disk and of the valve cone in their connection region are arranged in a desired way in relation to one another in order that they can subsequently be interconnected – preferably by means of material connection – without further alignment.

Please add the following new heading before paragraph [0012]:

BRIEF DESCRIPTION OF THE DRAWINGS

Please add the following new heading before paragraph [0018]:

DETAILED DESCRIPTION

Please replace paragraph [0021] with the following amended paragraph:

[0021] The valve disk 7 is provided on its flat side which faces away from the combustion chamber of the internal combustion engine during operation of the lightweight valve 1 with a recess 9 into which the valve cone 5 ~~7~~-projects with its end of greater diameter, as can be seen from figure 1. In this connection, the recess 9 is designed in such a way that the transition between valve disk 7 and valve cone 5 in their connection region is continuous. The hollow space of the valve cone 5 is closed by means of the valve disk 7. In this illustrative embodiment, the bottom of the recess 9 is of plane design. The diameter of the recess 9 and the outside diameter of the valve cone 5 at its end of greater diameter are the same or approximately the same.

Please replace paragraph [0023] with the following amended paragraph:

[0023] The valve disk 7 is of disk-shaped design and has a first, cylindrical longitudinal portion 13 of constant cross section and, adjoining this, a conical, that is frustoconical, second longitudinal portion 15, the cone angle of the second longitudinal portion 15 being the same as the cone angle of the valve cone 5 7—at its end of greater diameter, by virtue of which a continuous transition is brought about in the connection region between these parts, as illustrated in figure 1. The lateral surface of the longitudinal portion 15 usually forms the sealing surface of the lightweight valve 1.

Please replace paragraph [0028] with the following amended paragraph:

[0028] The valve cone 5 illustrated in figures 1 and 2 has a funnel shape overall, which is formed by a basic body in the shape of a disk spring and a collar-shaped guiding and centering portion 25 adjoining the end of smaller diameter of the basic body, the guiding and centering portion 25 being perforated by a through-opening 27, through which the stem connection element 17 extends in the joined-together state. The diameter of the through-opening 27 is the same as or greater than the outside diameter of the stem connection element 17, so that either the latter extends through the through-opening 27 with play or a non-positive connection is formed between stem connection element 17 and valve cone 5. When the valve cone 5 is pushed onto the stem connection element 17, these parts are automatically aligned/centered in relation to one another radially relative to the longitudinal central axis 20 of the lightweight valve owing to the guiding and centering portion 25. Owing to the design described above of the lightweight valve 1, the valve cone 5 7—is also centered and moreover supported at its end of smaller diameter by means of the thickening 19. The support and centering of the valve cone 5 at its end of greater diameter is effected by means of the recess 9, or the edge step 11.

Please replace paragraph [0029] with the following amended paragraph:

[0029] It remains to state that the valve cone 5 7—has a reduced wall thickness in the region of its guiding and centering portion 25, so that it as it were nestles against the outside of the stem connection element 17. By virtue of this, a transition between valve cone 5 and stem connection element 17 is brought about which has only a small step. In order to create a continuous

transition in this region, the stem connection element 17 can have a corresponding taper on its outside in the region of its free end.

Please replace paragraph [0031] with the following amended paragraph:

[0031] The illustrative embodiment of the lightweight valve 1 described with reference to figures 1 to 3 is characterized by small wall thicknesses of the individual parts, in particular of the valve cone 5 7, and consequently by only a small weight. It is furthermore advantageous that, by means of the stem connection element 17, not only is the valve cone 5 supported in regions but at the same time a desired alignment and positioning of valve cone in relation to valve disk also takes place. The gas forces acting on the valve disk 7 during operation of the lightweight valve 1 are advantageously introduced directly into the valve stem 3 via the centrally arranged stem connection element 17. Owing to the construction referred to above of the lightweight valve 1, the gas forces acting on the valve disk 7 are not, or are only to a harmless extent, introduced into the very thin-walled valve cone 5. Inadmissibly great deformation of the valve cone 5 can therefore reliably be excluded.

Please replace paragraph [0033] with the following amended paragraph:

[0033] It remains to state that the valve stem 3, the valve disk 7 and the stem connection element 17 can be made from the same material or from different materials. The connection between valve disk 7 9 and valve stem 3 via the stem connection element 17 can be effected by means of friction welding, beam welding, fusion welding or capacitor discharge welding. Connecting the extremely thin-walled valve cone 5 to the stem connection element 17 in the region of the guiding and centering portion 25 and/or of the supporting surface 21 is preferably effected by means of beam, fusion or laser welding.

Please amend the heading on top of page 9 with the following amended heading:

~~Patent claims~~ WHAT IS CLAIMED IS: